Abstract Submitted
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Supersymmetry from a Fundamental Statistical Theory SEIICHIROU YOKOO, ROLAND ALLEN, Physics Dept., Texas A&M Univ. — We derive a nearly-standard form of supersymmetry from a quite nonstandard fundamental theory, which is motivated by two ideas: (1) A Euclidean path integral in quantum physics is equivalent to a sum-over-states in statistical physics. This suggests that a fundamental description of nature at the Planck scale is likely to be statistical. (2) A truly fundamental theory should explain the origin of spacetime, quantum fields, gravity, gauge fields, and supersymmetry. We start with a statistical picture that has been introduced elsewhere [1] and add some new understanding. First, we emphasize that the imaginary random Gaussian potential of Ref. 1 (c) must be regarded as an additional postulate of the theory. Second, we point out that the more natural description of fundamental bosons (including Higgs bosons and sfermions) is one in which they have spin zero (as in Ref. 1 (a)) rather than spin 1/2 (as in Ref. 1 (b)). There are then at least two novel predictions of the theory presented here: the lack of a conventional coupling to gravity for Higgs bosons and sfermions, and violation of Lorentz invariance for fermions at very high energy [2]. [1] R.E. Allen, (a) hep-th/9612041; (b) hep-th/0008032; (c) hep-th/0310039. [2] R.E. Allen and S. Yokoo, Nuclear Physics B (Proc. Suppl.) 134, 139 (2004); hep-th/0402154.

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